The PAA500 skeleton is sensitive to the pH; the ionizable carboxyl functional groups have a pK_0 in the region of 4.25 pH units.

1) Synthesis of the PAAgNIPAM copolymer

a) Procedure

The route of synthesis followed consists in grafting short chains of NIPAM on a small fraction of carboxylic acid functional groups of a polyacrylic acid skeleton. It can be separated into two stages:

Synthesis of oligoNIPAM, a short chain of PNIPAM (Mw ≈ 2 000 g/mol) ending with an amine functional group, by free-radical polymerization of NIPAM monomers in methanol in the presence of the transfer agent AET.HCl (2-aminoethanethiol hydrochloride) and of the initiator AIBN (2,2'-azobisbutyronitrile) at 60°C for 20 hours (this mode of synthesis constitutes an alternative to that, in aqueous solution, used to prepare the PNIPAM-A polymers in Example 1).

The oligoNIPAM of known length are then grafted onto the PAA500 skeleton reaction between acid and amine functional groups in the presence of a podiimide initiator:

- either in water at 60°C for 1 hour (initiator EDC 1,2-dichloroethane),
- or in N-methylpyrrolidone (NMP) at 60°C for 24 hours (initiator DCCI dicyclocarbodiimide).

Table 4 presents the composition of the PAAgNIPAM copolymer obtained by this protocol.

Table 4:

	Synthesis of PAAgNIPAM I in water	
	m (g) or V (ml)	n (mmol)
OligoNIPAM	1.7 g	0.7
PAA500	3 g	
Initiator	0.575 g	3
Solvent	250 ml	
Copolymer m (g)	4.58	
grafting level[a]	18	

[a] % by weight of NIPAM determined by NMR.

EXAMPLE 11:

Rheological behaviour of the PAAgNIPAM I copolymer.

The variation of the viscosity as a function of the temperature was plotted under the same conditions as in Example 6 above apart from the use of a shear gradient 100 s^{-1} and a rate of temperature rise of 2°C per minute. The thermothickening effect appears at 33°C for PAAgNIPAM I and extends up to 65°C, only exhibiting one growth phase and the beginning of a plateau over this temperature range. This shows that using the examples and descriptions given above, it is also possible to prepare copolymers having a charged hydrophilic skeleton and a multiplicity of blocks with LCST giving rise to thermocrosslinking and which can be used in the context of the invention.

CLAIMS

1. Heat-sensitive medium for the separation of species in a separating channel, the said medium comprising an electrolyte in which at least a set of block copolymers is dissolved, characterized in that the said block copolymers:

- are provided in the said electrolyte at a sufficient concentration to confer on the said medium the ability to reversibly transit from a viscosity state V1, obtained at a temperature T1, to a viscosity state V2 which is at least 100% higher than V1, obtained at a temperature T2 which is at least 20°C higher than T1 and

- comprising in their structure at least

  - two noncontiguous polymeric segments exhibiting an LCST in the said electrolyte and possessing an average number of atoms along their skeleton which is greater than 50, and

  - a polymeric segment which is soluble in the electrolyte at the temperatures T1 and T2.

2. Medium according to Claim 1, characterized in that the temperature T1 is between 15°C and 30°C.

3. Medium according to Claim 1 or 2, characterized in that the temperature T2 is between 40°C and 80°C.

4. Medium according to one of Claims 1 to 3, characterized in that the viscosity V2 is greater than the viscosity V1 by at least a factor equal to 5 at the viscosity V1.